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(54) APPARATUS FOR MAKING OR DISPENSING DRINKS

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Description

The present invention relates to a device for discharging metered quantites of liquid concentrate comprising a housing having wall means defining a hollow interior, a flexible member dividing the interior of the housing into a first chamber and a second chamber, inlet valve means in the communication with the first chamber for permitting the flow of concentrate therethrough into the first chamber when the inlet valve means is opened and the inlet valve being closable to resist reverse flow of concentrate therethrough, outlet valve means in communication with the first chamber for discharging concentrate therefrom, and gas inlet means in communication with the second chamber for the supply of gas thereto for pressurisation of said hollow interior to cause said flexible member to flex so as to discharge concentrate from the first chamber through said outlet valve means.

US 4334640 (van Overbruggen et al) discloses a device as described above in which the outlet valve means is provided by a tubular portion having a central bore in communication with a plurality of radial bores providing fluid communication between the chamber of the device which may contain concentrate and the exterior of the device. A thin resilient piece of hose is arranged to cover the openings of the plurality of radial bores, the resilience of the wall of the piece of hose being arranged to hold the wall in contact with the outlets of the radial bores to close the valve. At a predetermined pressurisation of the device, the fluid pressure is such that concentrate may be pushed out of the device via the radial bores and deform the resilient piece of hose to open the valve and allow concentrate to flow from the device.

If the outlet valve of the device described in US 4334640 is to provide an adequate seal, the piece of hose would need to be tightly fitting and strongly elastic. The disadvantage of this is that the pressure change required to open the valve would be relatively large. If the device is to be operated by a lower pressure change then the hose would need to be relatively weak and the concentrate contained in the device would be likely to leak out under the static pressure of the concentrate in the dispensing tube.

The object of the present invention is, at least in the preferred embodiment, to provide an improved concentrate discharging device.

The device according to the present invention is characterised in that the outlet valve means comprises an opening in a first portion of the wall means and a valve head carried by a second portion of said wall means, said first and second portions of said wall means being relatively moveable for effecting relative movement of the valve head and valve opening, and being resiliently biased to a first relative position in which the opening is closed by the valve head and being arranged to move in response to said pressurisation of the device to a second relative position in which the outlet valve means is opened.

Embodiments of the invention will now be described, by way of example only, with reference to the accompanying drawings, in which:-

Figs. 1 to 4 are diagrammatic cross-sectional views of a dispensing device according to an embodiment of the invention, showing the device in four different conditions;

Fig. 5 is a cross-section on the line V-V shown in Fig. 1;

Fig. 6 is a perspective view, partly cut-away, of a part of the device of Figs. 1 to 5;

Fig. 7 is an enlarged section through part of the device shown in Figs. 1 to 4;

Fig. 8 is an enlarged perspective view of part of the device as shown in Fig. 7;

Figs. 9 and 10 are views similar to Figs. 2 and 3 but showing an alternative embodiment of the invention; and

Fig. 11 is an enlarged sectional view through part of the device shown in Figs. 9 and 10.

Figs. 1 to 8 show a concentrate supply device 2 comprising a concentrate container 4, such as a liquid tight box, and a concentrate dispensing unit 6 which is secured to the container 4, and is for dispensing concentrate therefrom in metered quantities. Intially, the container 4 is filled with liquid concentrate 8 to be dispensed although each of Figs. 1 to 4 show that the container 4 has already been partly emptied.

The dispensing unit 6 comprises a cylindrical side wall 10 which is secured, as by welding, to a disc shaped upper wall 12 having an outwardly extending flange 14 by which the unit 6 is secured, again as by welding, to a wall 16 of the container 4. A lower wall 18 of the unit 6 is carried by the cylindrical wall 10 and has a central circular aperture 20 through which projects a stem 22, of circular cross-section, carried by the upper wall 12. A flexible plastics diaphragm 24 of relatively flimsy material is provided in the unit 6. The diaphragm 24, as best seen in Fig. 6, is of bag-like construction and is of a size and shape such that, as shown in Fig. 2, it may conform to the interior of the walls 10 and 18. The diaphragm is open at its upper end and the upper edge 26 thereof is secured between the walls 10 and 12. The diaphragm 24 has an opening 28 at its lower end and the perimeter of the opening 28 of the diaphragm is secured as by welding to the portion of the wall 18 surrounding the aperture 20. The diaphragm 24 accordingly divides the interior of the unit 6 into two chambers 30 and 32. The chamber 30 communicates with the interior of vessel 4 through a passage 34 which may be

closed by a one-way valve 36 and the chamber 32 may receive pressurised gas from a gas supply (not shown) through a nipple 38 into which the end of a gas supply pipe 40 may be inserted. Preferably, the wall 12, flanges 16 and stem 22 are formed as a first unitary plastics moulding and the wall 10, wall 18 and nipple 38 are formed as a second unitary plastics moulding, the two mouldings being secured together with the upper edge 26 of the diaphragm 24 clamped therebetween.

The stem 22 is hollow to define a passage 42 which, at its lower end communicates with atmosphere, and its upper end may communicate with the interior of the container 4 through a passage 44 which may be closed by a one-way valve 46.

A circumferential channel 48 is provided on the outside of stem 22 at a position near but spaced from the lower end. The size of the opening 20 in wall 18 is such that the wall 18 extends into the channel 48 and normally contacts the stem 20 at a point 50 therein to form a seal. Four axial channels 52 extend along the exterior of the portion of the stem 20 below the circumferential channel 50. The wall 18 is flexibly resilient so that it may bend from the full line position shown in Fig. 7 in which a seal is formed at point 50 to the chain dotted line position 54 shown in Fig. 7 in which the seal at point 50 is broken and contact is made with the stem at point 56 adjacent the upper end of the channel 52. The resilience of the wall 18 is sufficient to permit the lower part of stem 22 to be pushed through the aperture 20 during assembly.

The valve 36 is made of a unitary moulding of synthetic plastics material and comprises a ball 60 forming a valve head, a ligament 62 extending through the passage 34 and a cross-bar 64 on the opposite side of the passage 36 to the head 60 and acting as a stop limiting the downwards movement of the head 60. The ligament 62 is sufficiently flexible to enable it to be bent so that the cross-bar 64 extends generally parallel to the ligament to enable the ligament and cross-bar to be threaded through the aperture 34 during manufacture. The construction of the valve 46 is identical to the valve 36 and thus comprises a head 70, ligament 72 and cross-bar 74.

The device illustrated in Figs. 1 to 8 will normally be supplied to customers with the container 4 filled with concentrate and the metering unit 6 empty. A cap 76 shown in broken lines in Fig. 1 only is preferably included and is attached to the unit 6 by a breakable seal (not shown) and covers the lower end of the stem 22 and the nipple 38. In order to use the device, the customer removes the cap 76 and inserts the device into a carbonating apparatus, not described herein in detail, which is designed for receiving the device 2. The device 2 is inserted in the carbonating apparatus in the "inverted" position illustrated in Figs. 1 to 4 and the pipe 40, which is part of the carbonation apparatus, is inserted into the nipple 38 and forms a gas tight seal therewith. At this point, the chamber 32 is not pressurised and, as a result, liquid may flow under gravity from the interior of the container 4 into the chamber 30, the valve 36 opening for this purpose as shown in Fig. 1. As liquid leaves the interior of the container 4 and enters the chamber 30, pressure within the container 4 may reduce and as a result atmospheric pressure acting on valve head 70 will cause the valve 46 to open to permit air to bubble up through the liquid in container 4 as indicated at 78 in Fig. 1. Of course, if the chamber 30 is filled with air when the device is first used, the air in the chamber 30 will first be transferred through the passage 34 into the container 4 as liquid enters the chamber 30, in which the case the opening of the valve 46 may be delayed.

As shown in Fig. 2, after the chamber 30 has been filled with liquid concentrate from the container 4, valve 46 closes. The unit 6 now contains a metered quantity of liquid to be dispensed. As shown in Fig. 3, this metered quantity of liquid may be dispensed from the unit 6 by permitting gas pressure to enter chamber 32 through pipe 40. The admission of such gas is preferably controlled by a control and timing system (not shown) of the carbonation apparatus (not shown) with which the device 2 is used. Such a device is disclosed in GB 2233960. As the pressure in chamber 32 increases, the resulting tendency of the liquid in chamber 30 to be forced upwardly through the passage 34 causes the valve 36 to close (Fig. 3). This pressure also causes wall 18 to flex downwardly as shown in Fig. 3 and in broken lines in Fig. 7, thus allowing liquid in the chamber 30 to be discharged therefrom through the opening 20 in the wall 18. If the pressure in chamber 32 is sufficiently high, the wall 18 will be bent to the chain dotted line position shown in Fig. 7 and the liquid leaving the chamber 32 will pass through the relatively small apertures defined by the channels 52 and the edge of the wall 18 around the opening 20, as indicated by arrows 80 in Fig. 7. If the pressure is somewhat lower than that necessary to achieve this condition, contact will not be made at point 56 between wall 18 and stem 22 and as a result, the outflow of liquid will not be constricted by the channels 52. In this way, variations in the rate of outflow of liquid as a result of pressure variations in chamber 32 may be reduced.

The pressure in chamber 32 is retained long enough to substantially empty the chamber 30 of liquid, at which point, as shown in Fig. 4, the diaphragm 24 has reduced the volume of chamber 30 to near to zero. Thereafter, the pressure in chamber 32 may be released and chamber 30 will again fill with concentrate as shown in Figs. 1 and 2;

The embodiment shown in Figs. 9 to 11 is the same as that of Figs. 1 to 8 except that the lower wall 18A of unit 6 is substantially rigid and, instead, the upper wall 12A is resiliently flexible and is thus somewhat thinner than the wall 12. Fig. 9 shows the chamber filled with liquid 30 to be dispensed and Fig. 10 shows the dispensing operation with the chamber 32 pressurised. As can be seen, the wall 12A flexes upwardly to draw the stem 20 upwardly with respect to the aperture 20 in wall 18A,

thus permitting liquid to be discharged from the chamber 30 through aperture 20. The distance through which the stem 20 moves upwardly relative to the wall 18 depends upon the pressure in the chamber 32 so that, when the pressure is high, the liquid is constrained to flow through the restricted area defined by the edge of the wall 18A around the aperture 20 and the channels 52 whereas lower pressures cause the stem 20 to assume intermediate position at which the area available for the outflow of liquid is greater.

Various modifications are possible within the scope of the invention. For example, although it has been assumed that the container 4 is of relatively rigid material in the illustrated embodiments, thus requiring provision for air to enter as the liquid leaves (this provision being the valve 46 in the embodiment shown in the drawings), the invention can be applied to so-called "bag-in-a-box" containers in which the liquid is contained in a collapsible bag located in a box. In this case, dispensing can be achieved without the need for air to enter the bag containing the liquid since this collapses under atmospheric pressure as liquid is withdrawn.

The invention provides a highly advantageous and inexpensive device for dispensing concentrate which may be made sufficiently cheaply to be disposed of after the liquid in the container with which it is used has been consumed.

Claims

1. A device (2) for discharging metered quantities of liquid concentrate comprising a housing having wall means (10, 12, 18; 12A, 18A) defining a hollow interior (30, 32), a flexible member (24) dividing the interior (30, 32) of the housing into a first chamber (30) and a second chamber (32), inlet valve means (36) in communication with the first chamber (30) for permitting flow of concentrate therethrough into the first chamber (30) when the inlet valve means (36) is open and the inlet valve being closeable to resist reverse flow of concentrate therethrough, outlet valve means (20, 22) in communication with the first chamber (30) for discharging concentrate therefrom, and gas inlet means in communication with the second chamber for the supply of gas thereto for pressurisation of said hollow interior (30, 32) to cause said flexible member (24) to flex so as to discharge concentrate from the first chamber (30) through said outlet valve means (20, 22); characterised in that said outlet valve means (20, 22) comprises an opening (20) in a first portion of said wall means (18; 18A) and a valve head (22) carried by a second portion of said wall means (12;12A), said first and second portions (18, 12; 18A, 12A) of said wall means being relatively movable for effecting relative movement between the valve head (22) and the valve opening (20), and being resiliently biased to a first relative position in which the opening is closed by the valve head (22) and being arranged to move in response to said pressurisation to a second relative position in which the outlet valve means (20, 22) is open.

2. Apparatus according to claim 1 in which the first portion (18; 18A) of the wall means is relatively flexible and the second portion (12;12A) of the wall means is relatively rigid so that, in response to said pressurization, the first portion (18;18A) of the wall means moves relative to the second portion (12;12A) of the wall means thereby moving the valve head (22) to open the outlet valve means (20, 22).

3. Apparatus according to claim 2 in which, in the absence of said pressurisation, the valve head (22) is biased into engagement with the valve opening (20) by the resilience of the first portion (18,18A) of the wall to close the outlet valve means (20,22).

4. Apparatus according to claim 1 in which the first portion (18;18A) of the wall means is relatively rigid and the second portion (12;12A) of the wall means is relatively flexible so that, in response to said pressurization, the second portion (12;12A) of the wall means moves relative to the first portion (18;18A) of the wall means thereby moving the valve opening (20) to open the outlet valve means (20, 22).

5. Apparatus according to claim 4 in which, in the absence of said pressurisation, the valve head (22) is biased into engagement with the valve opening (20) by the resilience of the second portion (12;12A) of the wall to close the outlet valve means (20,22).

6. Apparatus according to any preceding claim in which the first portion (18;18A) of the wall means and the second portion (12;12A) of the wall means are arranged generally opposite each other.

7. Apparatus according to any preceding claim in which said hollow interior (30, 32) is generally cylindrical with the first and second portions (18, 12;18A, 12A) of the wall means being disposed at respective opposite ends of said generally cylindrical hollow interior (30, 32) and the flexible member (24) being generally cup-shaped and arranged to substantially conform with the interior wall of said hollow interior (30, 32) when said hollow interior (30, 32) is not pressurized.

8. Apparatus according to any preceding claim in which the valve head (22) is in the form of a stem connected to the second portion (12,12A) of the wall means and extending axially through the hollow interior (30,32).

9. Apparatus according to any preceding claim in which the second portion (12;12A) of the wall means also carries the inlet valve means (36), a first portion (26) of the flexible member (24) is sealed around the periphery of the second portion (12;12A) of the wall means, and a second portion (28) of the flexible member (24) is sealed to the first portion (18;18A) of the wall means around the periphery of the valve opening (20).

10. Apparatus according to any preceding claim in combination with a container containing liquid concentrate (4) in fluid communication with said inlet valve means (36) for providing liquid concentrate therethrough.

11. Apparatus according to claim 10 in which said valve head (22) further comprises an air inlet passage (42) in communication with the exterior of said housing and the interior of said container containing liquid concentrate (4) for permitting the flow of gas therethrough into said container (4), and including an air inlet valve (46) arranged for closing the air inlet passage (42) to resist the flow of concentrate from said container (4) therethrough.

12. Apparatus according to claim 7 in which said gas inlet means is arranged in the first portion 18;18a of the wall means.

Patentansprüche

1. Vorrichtung (2) zur Abgabe von abgemessenen Mengen eines Flüssigkeitskonzentrates mit einem Gehäuse mit Wänden (10, 12, 18; 12A, 18A), die einen hohlen Innenraum (30, 32) umgeben, einem flexiblen Element (24), das den Innenraum (30, 32) des Gehäuses in eine erste Kammer (30) und eine zweite Kammer (32) unterteilt, einem Einlaßventil (36) in der Verbindung zu der ersten Kammer (30), das den Durchfluß von Konzentrat in die erste Kammer (30) erlaubt, wenn das Einlaßventil (36) geöffnet ist, wobei das Einlaßventil schließbar ist, um einen Rückfluß des Konzentrats zu verhindern, einem Auslaßventil (20, 22) in Verbindung mit der ersten Kammer (30) zur Abgabe von Konzentrat, und mit einer Gaseinlaßeinrichtung in Verbindung mit der zweiten Kammer zum Zuführen von Gas, um den hohlen Innenraum (30, 32) unter Druck zu setzen und um zu bewirken, daß sich das flexible Element (24) biegt, um aus der ersten Kammer (30) durch das Auslaßventil (20, 22) Konzentrat abzugeben; dadurch **gekennzeichnet**, daß das Auslaßventil (20, 22) eine Öffnung (20) in einem ersten Abschnitt der Wand (18; 18A) und einen Ventilkopf (22) an einem zweiten Abschnitt der Wand (12; 12A) aufweist, wobei der erste und der zweite Abschnitt (18, 12; 18A, 12A) der Wand relativ zueinander bewegbar sind, um eine relative Bewegung zwischen dem Ventilkopf (22) und der Ventilöffnung (20) zu bewirken, und elastisch in eine erste relative Stellung vorgespannt sind, in der die Öffnung vom Ventilkopf (22) verschlossen ist, und wobei der erste und der zweite Abschnitt (18, 12; 18A, 12A) der Wand dafür vorgesehen sind, sich in Reaktion auf das unter Druck setzen in eine zweite relative Stellung zu bewegen, in der das Auslaßventil (20, 22) offen ist.

2. Vorrichtung nach Anspruch 1, wobei der erste Abschnitt (18; 18A) der Wand relativ flexibel ist und der zweite Abschnitt (12; 12A) der Wand relativ starr, so daß sich in Reaktion auf das unter Druck setzen der erste Abschnitt (18; 18A) der Wand relativ zum zweiten Abschnitt (12; 12A) der Wand bewegt, wodurch sich der Ventilkopf (22) bewegt, um das Auslaßventil (20, 22) zu öffnen.

3. Vorrichtung nach Anspruch 2, wobei der Ventilkopf (22) durch die Elastizität des ersten Abschnittes (18; 18A) der Wand in einen Eingriff mit der Ventilöffnung (20) vorgespannt ist, wenn kein Druck anliegt, um das Auslaßventil (20, 22) zu schließen.

4. Vorrichtung nach Anspruch 1, wobei der erste Abschnitt (18; 18A) der Wand relativ starr ist und der zweite Abschnitt (12; 12A) der Wand relativ flexibel, so daß sich in Reaktion auf das unter Druck setzen der zweite Abschnitt (12; 12A) der Wand relativ zum ersten Abschnitt (18; 18A) der Wand bewegt, wodurch sich die Ventilöffnung (20) bewegt, um das Auslaßventil (20, 22) zu öffnen.

5. Vorrichtung nach Anspruch 4, wobei der Ventilkopf (22) durch die Elastizität des zweiten Abschnittes (12; 12A) der Wand in einen Eingriff mit der Ventilöffnung (20) vorgespannt ist, wenn kein Druck anliegt, um das Auslaßventil (20, 22) zu schließen.

6. Vorrichtung nach einem der vorstehenden Ansprüche, wobei der erste Abschnitt (18; 18A) der Wand und der zweite Abschnitt (12; 12A) der Wand im wesentlichen einander gegenüberliegend angeordnet sind.

7. Vorrichtung nach einem der vorstehenden Ansprüche, wobei der hohle Innenraum (30, 32) im wesentlichen zylindrisch ist und die ersten und zweiten Abschnitte (18, 12; 18A, 12A) der Wand an den jeweils gegenüberliegenden Enden des im wesentlichen zylindrischen hohlen Innenraumes (30, 32) angeordnet sind, und wobei das flexible Element (24) im wesentlichen becherförmig und so angeordnet ist, daß es sich im wesentlichen an die Innenwand des hohlen Innenraumes (30, 32) anlegt, wenn der hohle Innenraum (30, 32) nicht unter Druck steht.

8. Vorrichtung nach einem der vorstehenden Ansprüche, wobei der Ventilkopf (22) die Form eines Stutzens hat, der mit dem zweiten Abschnitt (12; 12A) der Wand verbunden ist und der sich axial durch den hohlen Innenraum (30, 32) erstreckt.

9. Vorrichtung nach einem der vorstehenden Ansprüche, wobei der zweite Abschnitt (12; 12A) der Wand das Einlaßventil (36) trägt, wobei ein erster Abschnitt (26) des flexiblen Elements (24) dicht mit dem Umfang des zweiten Abschnittes (12; 12A) der Wand verbunden ist, und wobei ein zweiter Abschnitt (28) des flexiblen Elements (24) am Umfang der Ventilöffnung (20) dicht mit dem ersten Abschnitt (18; 18A) der Wand verbunden ist.

10. Vorrichtung nach einem der vorstehenden Ansprüche in Verbindung mit einem Behälter (4), der ein Flüssigkeitskonzentrat enthält und der mit dem Einlaßventil (36) in Fluidverbindung steht, um das Flüssigkeitskonzentrat abzugeben.

11. Vorrichtung nach Anspruch 10, wobei der Ventilkopf (22) einen Lufteinlaßdurchgang (42) aufweist, der mit der Außenseite des Gehäuses und dem Inneren des Flüssigkeitskonzentrat enthaltenden Behälters (4) in Verbindung steht, um den Durchfluß von Gas in den Behälter (4) zu ermöglichen, und mit einem Lufteinlaßventil (46), das dafür vorgesehen ist, den Lufteinlaßdurchgang (42) zu schließen, um den Durchfluß von Konzentrat aus dem Behälter (4) zu verhindern.

12. Vorrichtung nach Anspruch 7, wobei die Gaseinlaßeinrichtung im ersten Abschnitt (18; 18A) der Wand angeordnet ist.

Revendications

1. Dispositif (2) pour déverser des quantités mesurées de concentré liquide, comprenant un carter de parois (10, 12, 18 ; 12A, 18A) définissant une partie intérieure creuse (30, 32), un élément souple (24) divisant la partie intérieure creuse (30, 32) du carter en une première chambre (30) et une seconde chambre (32), une soupape d'entrée (36) en communication avec la première chambre (30) pour permettre l'écoulement de concentré à travers cette soupape afin qu'il pénètre dans la première chambre (30) lorsque la soupape d'entrée (36) est ouverte, et la soupape d'entrée pouvant être fermée pour résister au débit inverse de concentré à travers celle-ci, une soupape de sortie (20, 22) en communication avec la première chambre (30) pour décharger du concentré de celle-ci, et une entrée de gaz en communication avec la seconde chambre pour fournir du gaz à celle-ci de manière à pressuriser la partie inférieure creuse (30, 32) pour amener l'élément souple (24) à fléchir de manière à décharger du concentré de la première chambre (30) par la soupape de sortie (20, 22) ;
caractérisé en ce que
la soupape de sortie (20, 22) comprend une ouverture (20) dans une première partie des parois (18 ; 18A) et une tête de soupape (22) portée par une seconde partie des parois (12 ; 12A), la première partie et la seconde partie (18, 12 ; 18A, 12A) des parois pouvant se déplacer l'une par rapport à l'autre pour produire un mouvement relatif entre la tête de soupape (22) et l'ouverture de soupape (20), ces parties étant poussées élastiquement dans une première position relative dans laquelle l'ouverture est fermée par la tête de soupape (22), et se trouvant disposées pour passer, sous l'effet de la pressurisation, dans une seconde position relative dans laquelle la soupape de sortie (20, 22) est ouverte.

2. Appareil selon la revendication 1,
dans lequel
la première partie (18 ; 18A) des parois est relativement souple et la seconde partie (12 ; 12A) des parois est relativement rigide de façon que, sous l'effet de la pressurisation, la première partie (18 ; 18A) des parois se déplace par rapport à la seconde partie (12 ; 12A) des parois pour déplacer ainsi la tête de soupape (22) de manière à ouvrir la soupape de sortie (20, 22).

3. Appareil selon la revendication 2,
dans lequel
en l'absence de pressurisation, la tête de soupape (22) est poussée en contact avec l'ouverture de soupape (20) par l'élasticité de la première partie (18, 18A) des parois, pour fermer la soupape de sortie (20, 22).

4. Appareil selon la revendication 1,
dans lequel
la première partie (18 ; 18A) des parois est relativement rigide et la seconde partie (12 ; 12A) des parois est relativement souple de façon que, sous l'effet de la pressurisation, la seconde partie (12 ; 12A) des parois se déplace par rapport à la première partie (18 ; 18A) des parois, pour déplacer ainsi l'ouverture de soupape (20) de manière à ouvrir la soupape de sortie (20, 22).

5. Appareil selon la revendication 4,
dans lequel
en l'absence de pressurisation, la tête de soupape (22) est poussée en contact avec l'ouverture de soupape (20) par l'élasticité de la seconde partie (12, 12A) des parois, pour fermer la soupape de sortie (20, 22).

6. Appareil selon l'une quelconque des revendications précédentes,

dans lequel
la première partie (18 ; 18A) des parois et la seconde partie (12 ; 12A) des parois, sont disposées d'une façon générale pour être opposées l'une à l'autre.

7. Appareil selon l'une quelconque des revendications précédentes,
dans lequel
la partie intérieure creuse (30, 32) est généralement cylindrique, la première partie et la seconde partie (18, 12 ; 18A, 12A) des parois, étant disposées aux extrémités opposées respectives de la partie intérieure creuse généralement cylindrique (30, 32), et l'élément souple (24) étant généralement en forme de coupelle, cet élément étant disposé pour se conformer essentiellement à la paroi intérieure de la partie intérieure creuse (30, 32) lorsque la partie intérieure creuse (30, 32) n'est pas pressurisée.

8. Appareil selon l'une quelconque des revendications précédentes,
dans lequel
la tête de soupape (22) se présente sous la forme d'une tige reliée à la seconde partie (12, 12A) des parois, et s'étendant axialement à travers la partie inférieure creuse (30, 32).

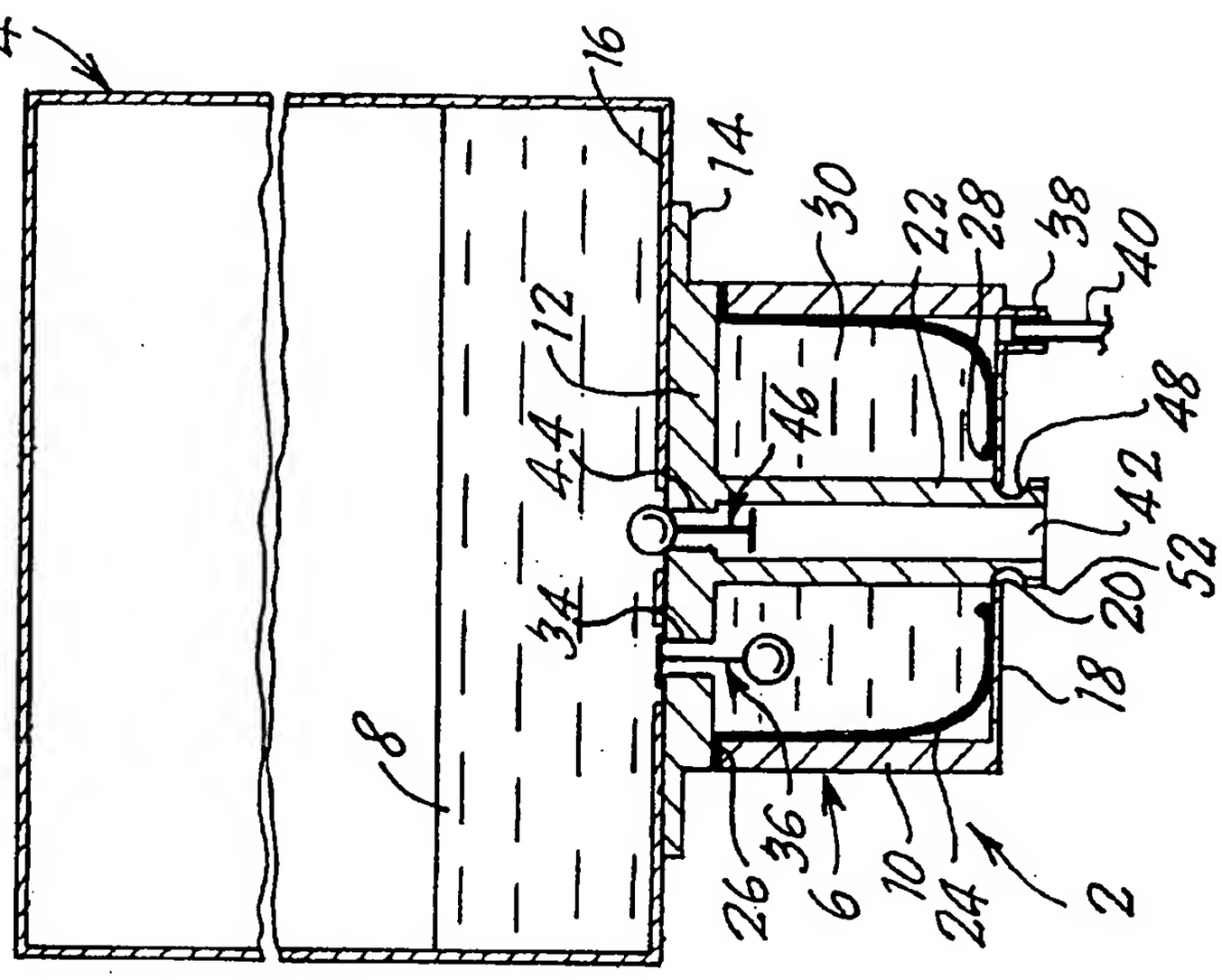
9. Appareil selon l'une quelconque des revendications précédentes,
dans lequel
la seconde partie (12 ; 12A) des parois porte également la soupape d'entrée (36), une première partie (26) de l'élément souple (24) étant scellée autour de la périphérie de la seconde partie (12 ; 12A) des parois ; et une seconde partie (28) de l'élément souple (24) étant scellée à la première partie (18 ; 18A) des parois autour de la périphérie de l'ouverture de la soupape (20).

10. Appareil selon l'une quelconque des revendications précédentes,
en combinaison avec
un réservoir (4) contenant du concentré liquide, en communication de fluide avec la soupape d'entrée (36) pour fournir du concentré liquide à travers celui-ci.

11. Appareil selon la revendication 10,
dans lequel
la tête de soupape (22) comprend en outre un passage d'entrée d'air (42) en communication avec l'extérieur du carter et l'intérieur du réservoir (4) contenant le concentré liquide pour permettre à du gaz de s'écouler à travers celui-ci pour pénétrer dans le réservoir (4), et comprenant une soupape d'entrée d'air (46) disposée pour fermer le passage d'entrée d'air (42) afin de résister à l'écoulement, à travers celui-ci, du concentré provenant du réservoir (4).

12. Appareil selon la revendication 7,
dans lequel
le moyen d'entrée de gaz est disposé dans la première partie (18 ; 18A) des parois.

FIG. 2


4
16
14
30
22
28
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12
46
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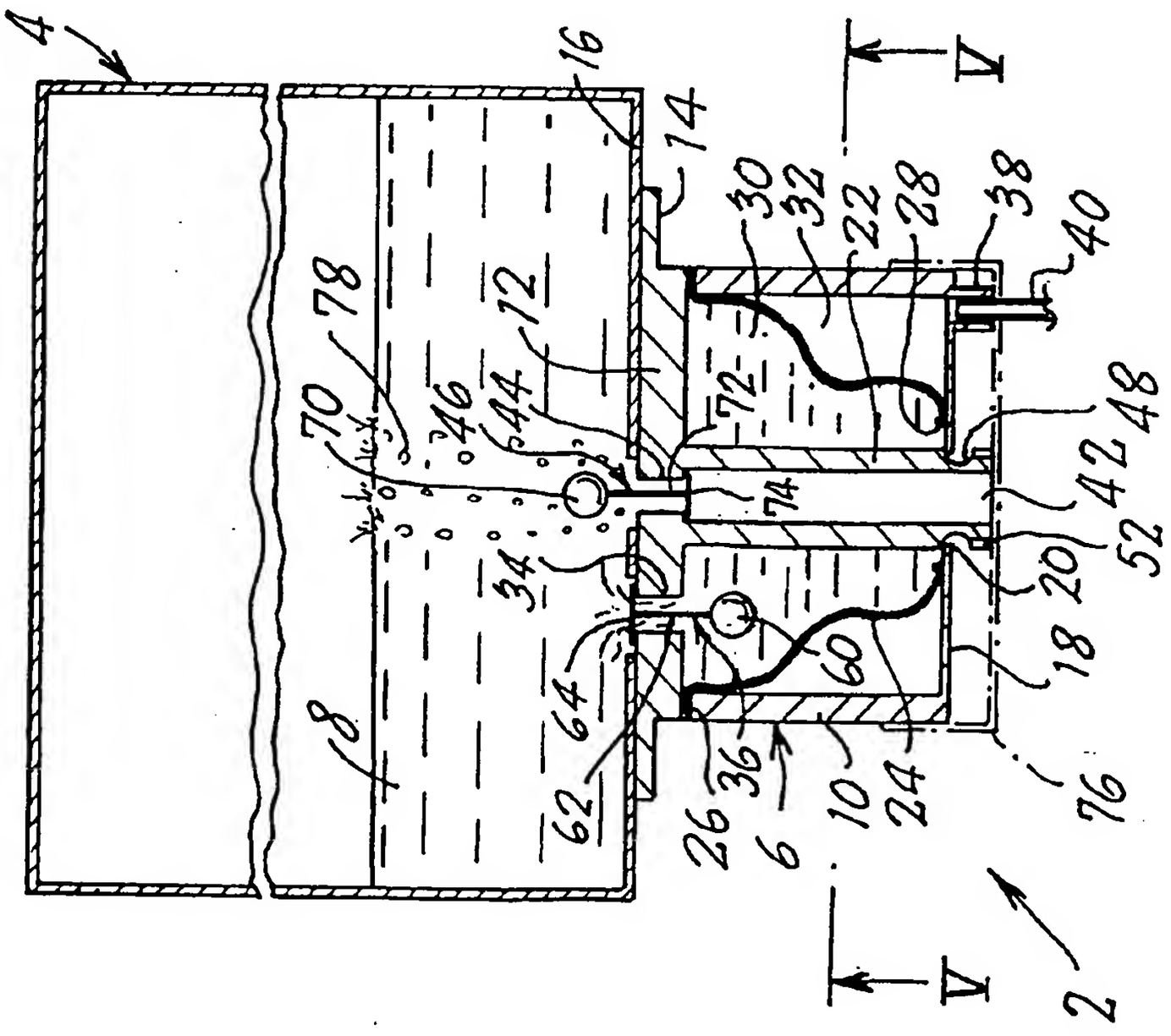
44
42
52
34
20
18
8
26
36
6
10
24
2

FIG. 1


4
16
14
V
30
32
22
28
38
40
78
12
70
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44
72
74
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18
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64
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62
36
10
24
76
26
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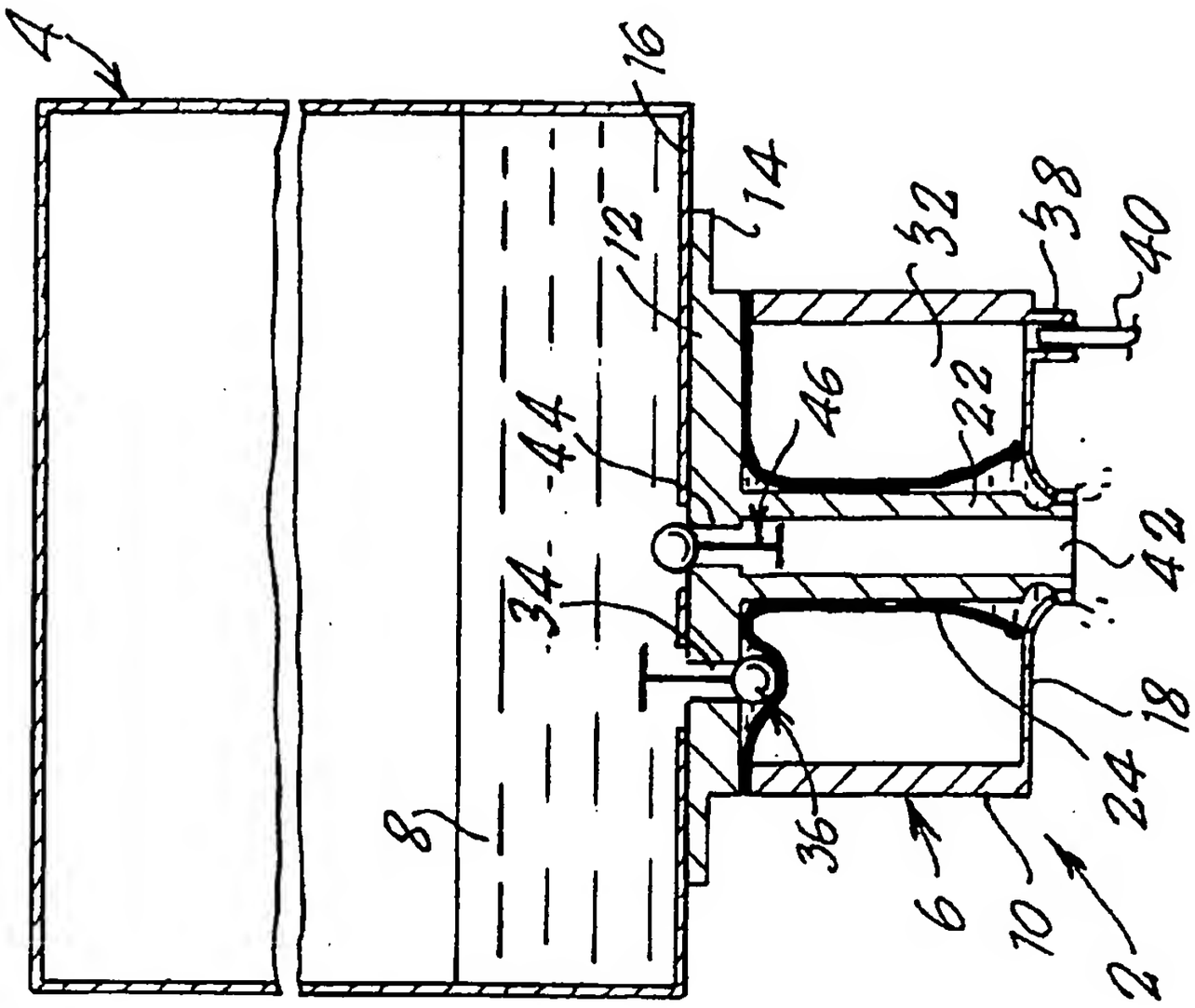
2
V

FIG.4


4
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46
22
44
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42
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36
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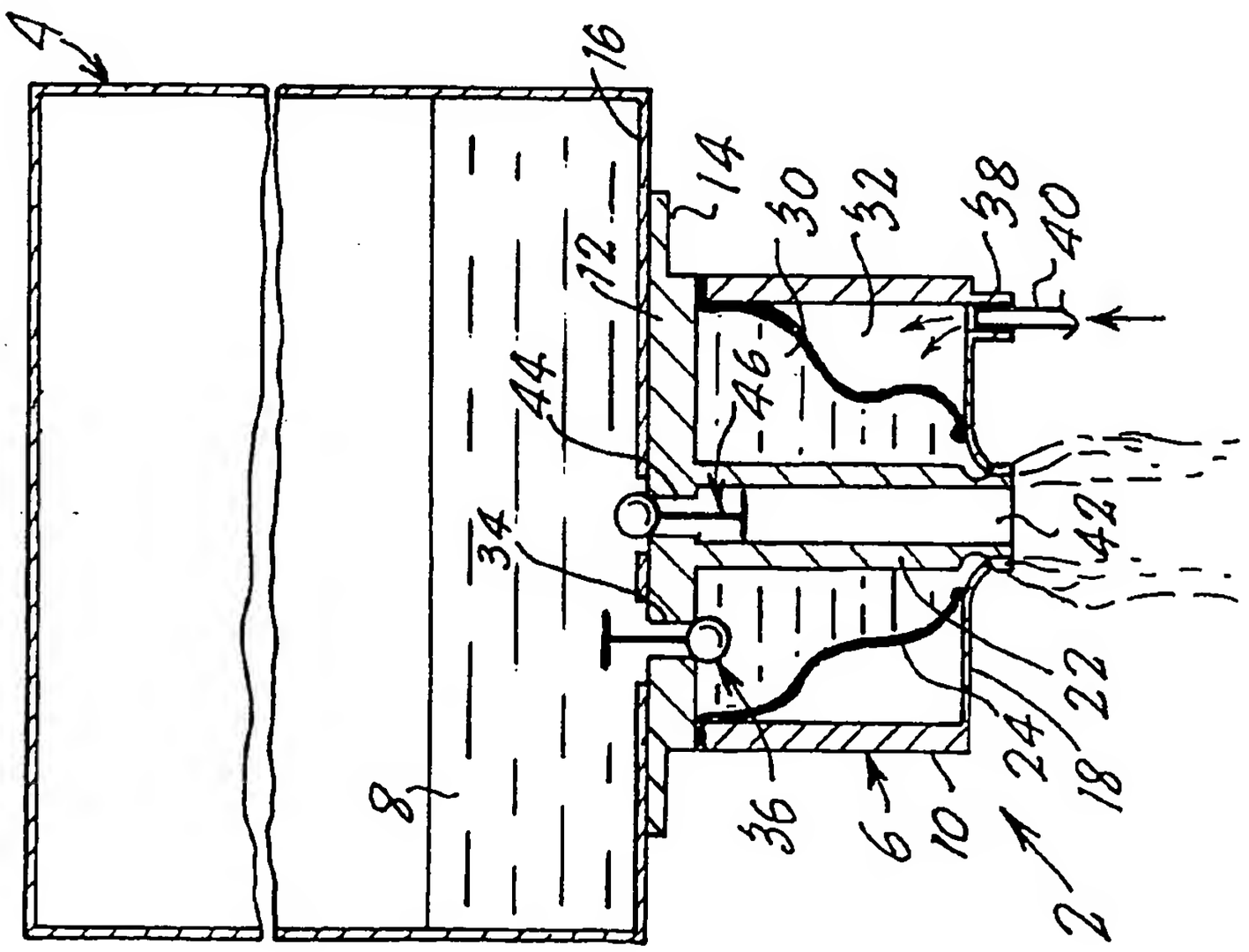
10
24
2

FIG.3


4
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12
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44
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18
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24
2

FIG.5

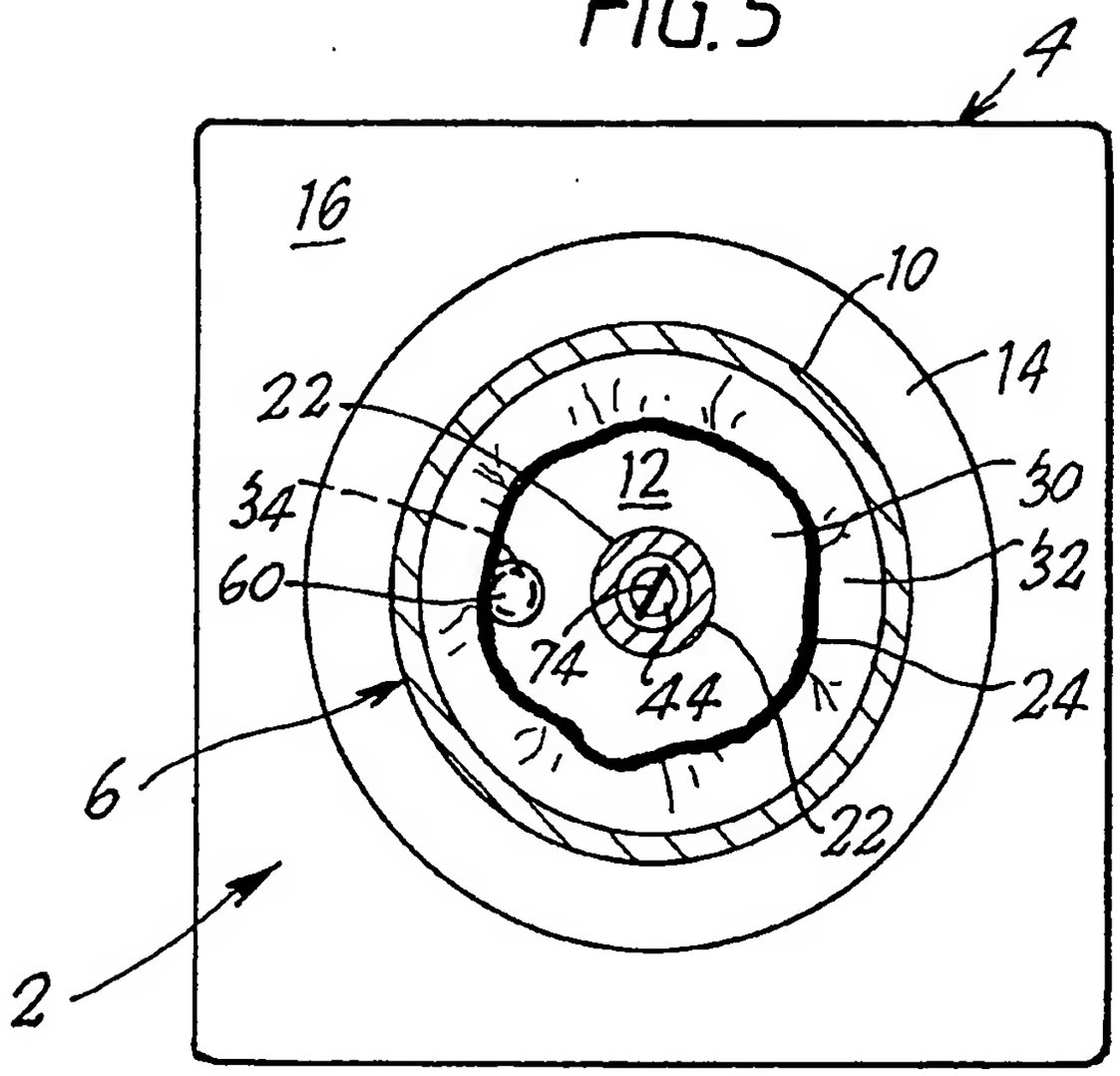


FIG.6

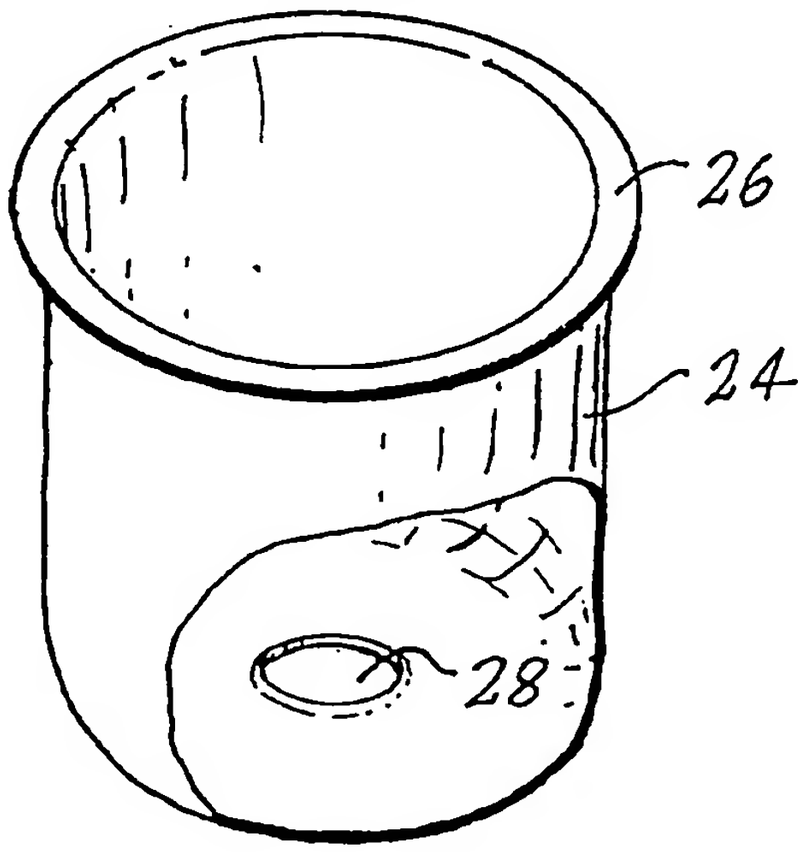


FIG.7

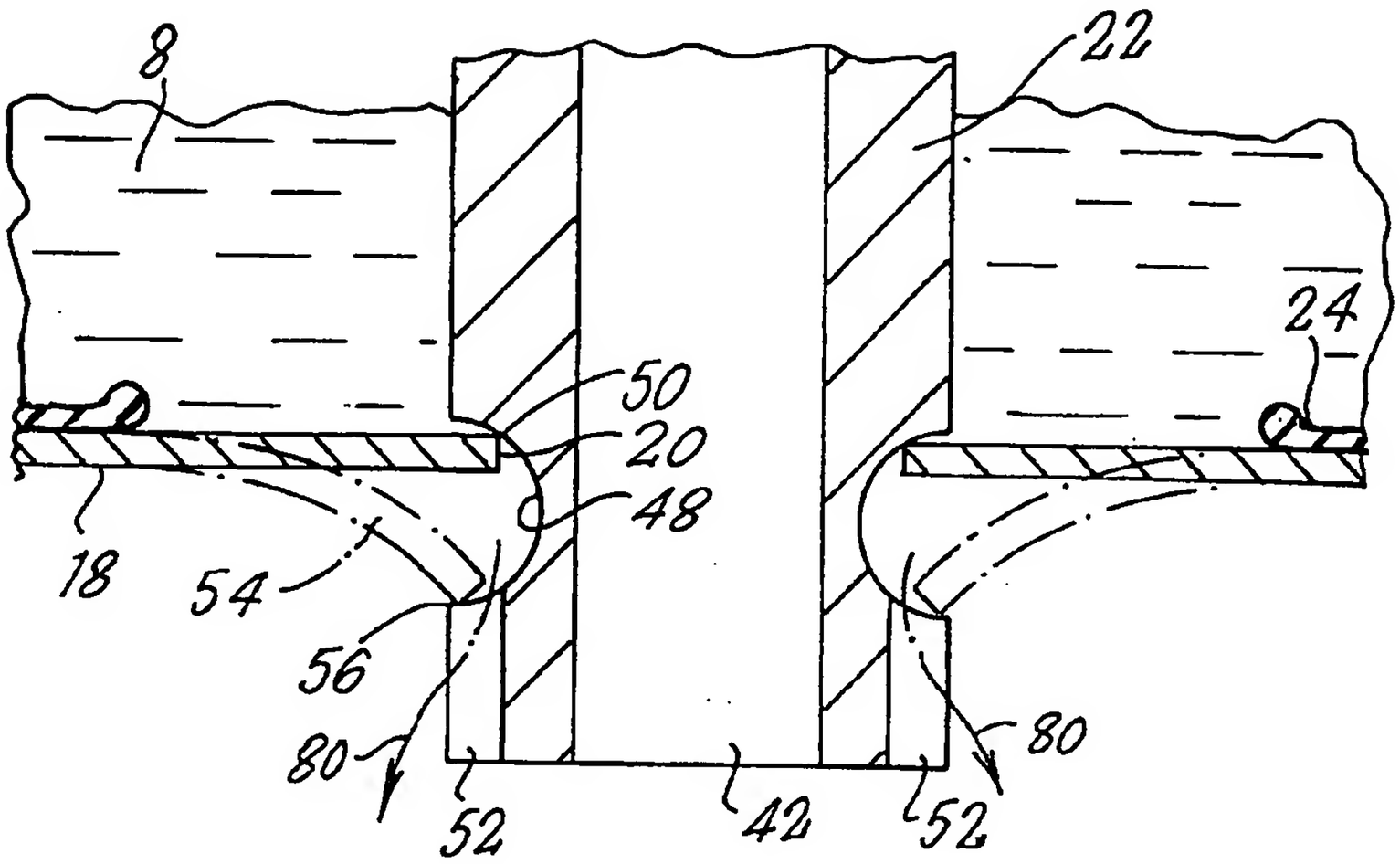
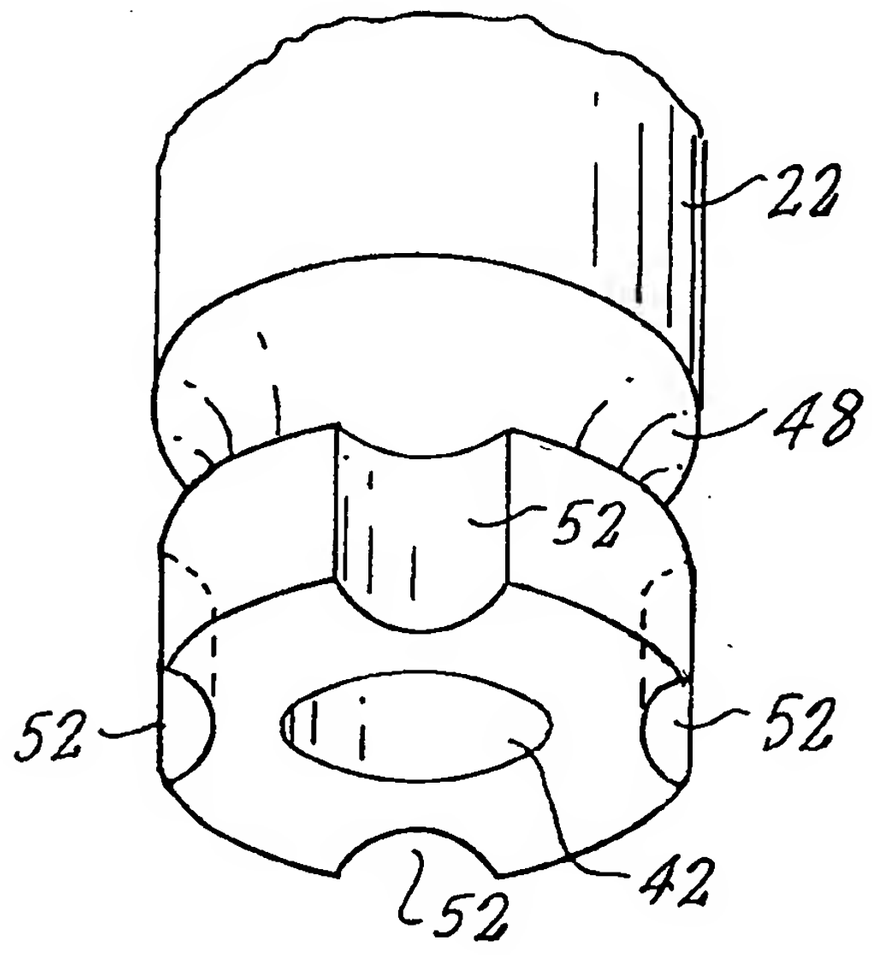


FIG.8



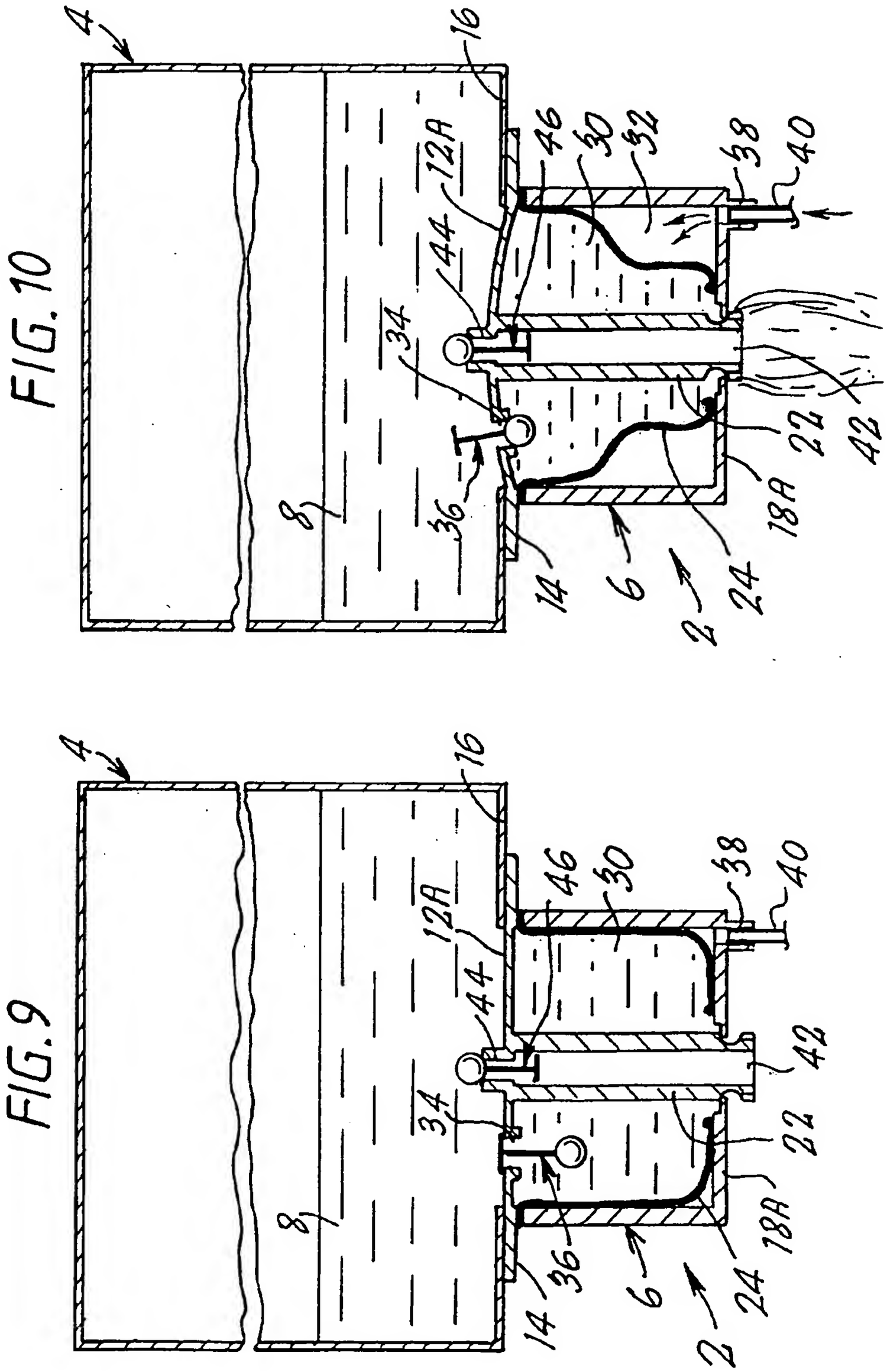

4
16
12A
46
30
32
38
40
44
34
8
36
14
6
2
24
18A
22
42

FIG. 10

4
16
12A
46
30
38
40
44
42
34
8
36
14
6
2
24
18A
22

FIG. 9

FIG.11